

**MMAC-M5FNB
MULTI-MEDIA ACCESS CENTER
OVERVIEW AND SETUP GUIDE**

CABLETRON
systems

The Complete Networking Solution™

CABLETRON SYSTEMS, P.O. Box 5005, Rochester, N.H. 03867-0505

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NOTICE

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CHAPTER 1

INTRODUCTION

The **MMAC-M5FNB™ Multi Media Access Center** offers maximum flexibility and convenience in the design and operation of your network. The enclosure provides space for one Repeater/Management Module and up to five Media Interface Modules (MIM™); or, by removing one of the five MIMs, you can add a second, load-sharing power supply module.

This manual is an installation and reference guide. It lists the features and options of the MMAC-M5FNB and explains how to install the fan tray, power supply(ies), and security bars. You should read through this manual prior to using the MMAC-M5FNB to gain a full understanding of the MMAC-M5FNB and its capabilities.

CAUTION: Only qualified personnel should install or service this unit and its modules!

1.1 USING THIS MANUAL

Chapter 1, **Introduction**, discusses the features and capabilities of the MMAC-M5FNB.

Chapter 2, **Installation Requirements and Specifications**, lists the location requirements that must be met before you install the MMAC-M5FNB on your network. This chapter also includes some MIM configuration guidelines, environmental guidelines, and operating specifications for the MMAC-M5FNB and related Power Supply Modules (M5PSM™).

Chapter 3, **MMAC-M5FNB Setup**, contains instructions for rack mounting your MMAC-M5FNB, inserting the fan tray, installing the power supply(ies), installing the security bars, and powering up the MMAC-M5FNB.

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1.2 USING THE MMAC-M5FNB MANUAL SET

Other manuals have been developed for the Repeater/Management modules and for each MIM that can be installed in your MMAC-M5FNB. These manuals explain how to install the individual modules into the MMAC-M5FNB, how to attach cable segments to the modules, and how to test those segments after they have been installed. Specifications for all modules are included in each manual.

Additional manuals have been developed on how to use Cabletron Systems' Network Control Management software packages.

Each manual in this set assumes that you have a general working knowledge of Ethernet or IEEE 802.3, 802.5, or FDDI type data communications networks and their physical layer components.

1.3 GETTING HELP

If you need additional support related to the MMAC-M5FNB, or if you have any questions, comments, or suggestions related to this manual, contact Cabletron Systems Technical Support. Before calling, please have the following information ready:

- The product type (MMAC-M5FNB), and the product serial number. The serial number is located on the front panel of the MMAC, and the product type is on the fan tray label.

You can contact Cabletron Systems Technical Support Department by any of the following methods:

By phone:	Monday through Friday between 8 A.M. and 8 P.M. Eastern Standard Time at (603) 332-9400.
By mail:	Cabletron Systems, Inc. PO Box 5005 Rochester, NH 03867-0505
By CompuServe [®] :	GO CTRON from any ! prompt

By Internet mail:	support@ctron.com
By FAX:	(603) 337-3075
By BBS:	(603) 335-3358 (4 lines available)

1.4 THE MMAC-M5FNB MULTI MEDIA ACCESS CENTER

The Cabletron Systems MMAC-M5FNB is a complete modular approach to integrated networks. The MMAC-M5FNB supports Local Area Networks compliant to IEEE 802.3, IEEE 802.5, and FDDI standards. It also supports all of the Cabletron Systems Media Interface Modules (MIMs).

A variety of IEEE 802.3, IEEE 802.5, and FDDI compliant media can be connected to the MMAC-M5FNB, including shielded and unshielded twisted pair, fiber optic cable, thick or thin coaxial cable, and standard AUI transceiver cable. Each media type has a MIM which, when installed into the MMAC-M5FNB, is compatible with all other MIMs installed in that unit. You can have complete network integration of a variety of media through a single source.

The MMAC-M5FNB is designed so that network expansions or changes in media types can be done without bringing down the entire network. In a matter of minutes, you can add, change, or replace MIMs without turning off the MMAC-M5FNB or using any special tools. This design also allows the MMAC-M5FNB to adapt to ever-changing industry standards. Figure 1-1 (following page) illustrates an MMAC-M5FNB equipped with a variety of MIM cards.

CAUTION: Only qualified personnel should install or service this unit and its modules!

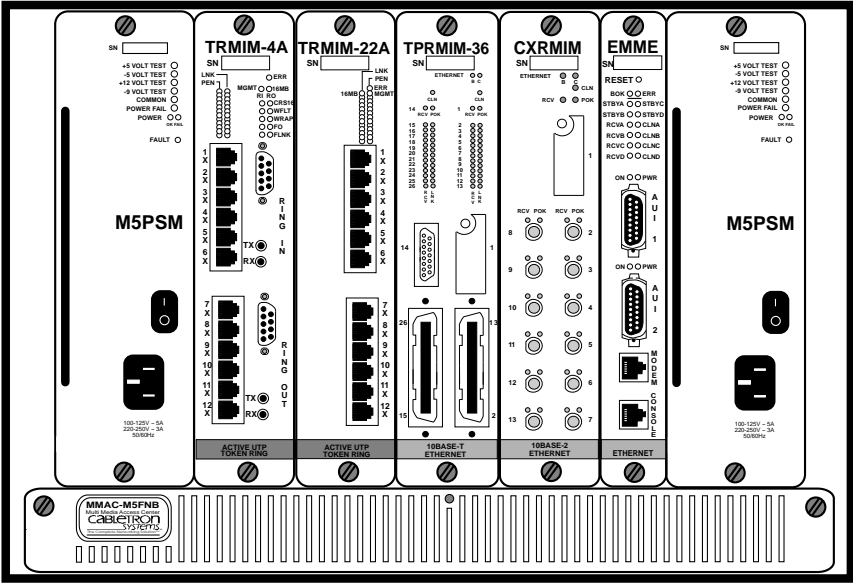


Figure 1-1. MMAC-M5FNB with Optional MIMs

1.5 MMAC-M5FNB FEATURES

Universal Power Supply

The MMAC-M5FNB power supply senses and automatically adjusts to the input voltage and frequency. No additional adjustments are necessary.

Built-in Power Supply Protection

The power supply module(s) automatically powers down under any of the following conditions: thermal overload (thermal protection); shorted output (over current, or short circuit protection); or excess output voltage (over voltage protection). The power supply will automatically recover when a thermal overload condition is corrected; when an over current or over voltage condition is corrected, the power

supply requires AC power cycling (turn power switch off, then on again) to recover. A FAULT LED on the power supply module indicates when an over current condition has occurred.

Note: *If you remove, then re-insert, the fan tray with no MIMs installed in the chassis and the power on, you will have to turn each power supply off, then on again to re-start.*

Power OK Signal

The same signal that illuminates the Power OK LED on the power supply module(s) will also alert the management module that the power supply is functioning normally.

Power Factor Correction

The MMAC-M5PSM meets the EN60555-2 limits for power factor correction, which may be required by utility companies in the near future.

The power factor correction feature provides a number of advantages. By improving this factor to meet the EN60555-2 limits, line noise and peak current levels are dramatically reduced and the amount of power available to the user is increased. Power factor correction also reduces stress on fuses, circuit breakers, wall sockets, wiring, and transformers.

Redundant Power with Current Sharing

The MMAC-M5FNB can operate with either one or two power supply modules. If two MMAC-M5PSMs are installed, they share the power load requirements of the installed MIMs; if one power supply fails, the second automatically assumes the entire load. This ensures that your network will remain operational until a replacement MMAC-M5PSM can be installed. The two power supply modules use a current sharing scheme such that each power supply provides 50% of the required load ($\pm 5\%$, 5V output only) under all load conditions.

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If a redundant power supply is not desired, a fifth MIM can be installed in the second power supply module slot.

Note: *The power requirements of some FDDI MIM configurations require dual power supplies. Consult the appropriate manuals for details.*

Hot Swapping

You have the option to “hot swap” power supply modules in the M5FNB. This allows you to remove or insert power supplies without powering down the M5FNB.

Note: *If you have an FDDI configuration in your chassis which requires the use of two power supplies, hot-swapping a power supply unit may cause an interruption in network service.*

Flexible Network Bus

The MMAC-M5FNB's Flexible Network Bus allows the M5PSMs to load share; it also allows Token Ring or FDDI modules to communicate with one another, and to co-exist with Ethernet modules in the same hub. Cabletron Systems offers a full line of media interface modules that let you create new networks and extend and connect existing networks.

Removable Fan Tray

The MMAC-M5FNB is equipped with a removable fan tray, which means that you can replace a failed fan unit quickly, without any special tools. The fan tray incorporates an LED that indicates fan status; the same signal that illuminates the LED also alerts the management module that the fans are operating properly.

WARNING: *The fan tray is hot-swappable; however, the MMAC chassis should **not** be run for extended periods of time without the fans installed, as it will quickly overheat.*

Rack Mountable Chassis

The MMAC-M5FNB chassis can be mounted into a standard 19" (48.26 cm) equipment rack. Separate rack mount brackets are included that allow the unit to be flush mounted or recessed 3" from the front plane of the rack mount unit for safety and ease of network connections.

Security Bars

A pair of security bars which fit over the knurled knobs that secure the MIMs to the chassis protect the hub from unauthorized removal or insertion of modules.

CHAPTER 2

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

This chapter describes the following:

- Site guidelines that must be met before installing an MMAC-M5FNB onto your network
- MMAC configuration guidelines
- Operating specifications for the MMAC-M5FNB enclosure and power supply module

CAUTION: *Only qualified personnel should install or service this unit and its modules.*

2.1 SITE GUIDELINES

The following guidelines must be followed when you select a site for the MMAC-M5FNB. If not, unsatisfactory network performance may result.

- **An unrestricted free surface area of 43.2 cm (17 in.) wide, 37.6 cm (14.8 in.) deep and 37.6 cm (14.8 in.) high is needed for the MMAC-M5FNB enclosure.**
- **If the MMAC-M5FNB is to be placed on a shelving unit, the shelf must be able to support 33.8 kg (75 lb.) of static weight.**
- **If the MMAC-M5FNB is to be rack-mounted, care must be taken to ensure that the rack used will support the unit and that the rack remains stable with the MMAC-M5FNB installed. In order to allow proper cooling within the rack, there must be 7.6 cm (3 in.) of clearance above the unit and 5 cm (2 in.) of clearance on either side of the unit.**

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

- A USA standard 3 prong power receptacle must be located within 2.13 m (7 ft.) of the site.
- The temperature of the location must be maintained between 5° and 40°C (41° to 104°F). Temperature changes of greater than 10°C (18°F) per hour must not occur.

2.2 MMAC-M5FNB CONFIGURATION GUIDELINES

The MMAC-M5FNB has four slots that accept media interface modules when the hub is configured with dual power supplies, and five MIM slots when the hub is configured with one power supply. (The slots are numbered from right to left; slot #1 is a half-width slot that is reserved for a management module.) Cabletron Systems management modules are equipped with a firmware-based management tool called Local Management, which lets you control the MMAC MIMs. Management modules are also SNMP compliant, which means that an MMAC equipped with a management module can be managed remotely by SNMP management software such as Cabletron Systems' Remote LANVIEW®/Windows, Remote LANVIEW® for SunNet Manager, or any one of the SPECTRUM® for Open Systems suite of management products.

You can combine Token Ring, Ethernet, and FDDI MIMs in the same MMAC; be sure to consult the appropriate management module and MIM installation guides for detailed setup information.

2.3 OPERATING SPECIFICATIONS

The following lists the specifications for the MMAC-M5FNB enclosure and for the MMAC-M5PSM. Cabletron Systems reserves the right to change these specifications without notice.

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

PHYSICAL

M5FNB

Dimensions: 14.8" high x 17" wide x 14.8" long (37.6 cm high x 43.2 cm wide x 37.6 cm long)

Weight: 17.3 lb (7.8 kg) with fan tray

M5PSM

Dimensions: 9.5" high x 3" wide x 13.625" deep (24.1 cm high x 7.6 cm wide x 34.6 cm deep)

Weight: 6.75 lb (3.0 kg)

POWER SUPPLY MODULE REQUIREMENTS

The MMAC-M5FNB power supply senses and automatically adapts to the input voltage and frequency.

Input Frequency: 47 to 63 Hz

Input Voltage: 100 to 125 Vac
200 to 250 Vac

Input Current: 5 A @ 115 Vac
2.5 A @ 230 Vac

Fuses: One 250 V, 10 Amp fuse (not user serviceable)

BTUs/hour: 1575.2

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

Table 2-1. Output Voltage Specifications

Output Voltage (Vdc)	Minimum Load (amps)	Maximum Load (amps)	Maximum Power (watts)
+5 (±1%)	3	40	200
+12 (±6%)	0	5	60
-5 (±3%)	0	2	10
-9 (±3%)	0	11	99

Note: *The maximum power out of each M5PSM power supply will not exceed 300 watts.*

This unit is intended for indoor use only, and must be used with a two-conductor-plus-ground power supply cord with a minimum HO5VV-F cord, minimum 0.75 mm² diameter conductors, an IEC 320 female receptacle (for connection to power supply), and a male plug appropriate to the country of installation.

CAUTION: *The supplied power cord is not designed for European installations. This unit is intended to be operated from a minimum 6 ampere branch circuit in Europe.*

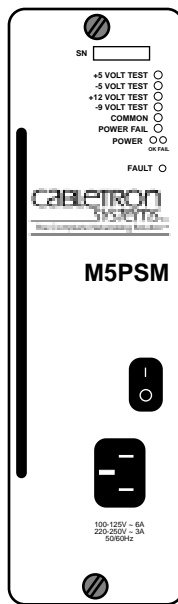


Figure 2-1. The MMAC-M5PSM

LEDs

OK (Power Supply)	When lit, this green LED indicates that the power supply module is operating correctly; a signal is also sent to the management/repeater module to indicate that the power supply is functioning properly.
Fail (Power Supply)	When lit, this red LED indicates a loss of input power, loss of regulation on any output, or the activation of any power fail circuit protection.
Fault (Power Supply)	When lit, this red LED indicates that an over current (short circuit) condition has occurred; this condition could result from inadequate power to the hub (only one power supply installed where two are required), or from a problem in the chassis itself. Once the over

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

current condition has been corrected, the power supply requires AC power cycling (turn the power switch off for at least one second, then on again) to recover.

Fan Tray LED	<p>This LED is green when all the fans are operating properly.</p> <p>The LED turns red when any fan slows to half speed or less, and signals the management/repeater module that there is a fan tray problem.</p>
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Note: When the M5FNB is first powered up, this LED will be red for a moment until the fans are operating at the proper speed.

TEST POINTS

Each power supply module has service-accessible test points for measuring each output, as well as for testing the power fail indication signal (see Figure 2-1, above).

Test points can measure each individual unit even when it is installed in parallel with another unit.

Note: The M5PSM test points represent the power supply output voltages and not the bus voltage seen by the Media Interface Modules. The voltages measured at the test points are one diode voltage drop above the bus voltage. The following are the voltage tolerances which ensure that the bus voltage is within specified limits:

+5 V test	4.85 V to 5.45 V
+12 V test	11.50 V to 13.10 V
-5 V test	-5.0 V to -5.65 V
-9 V test	-8.65 V to -10.00 V

Power Fail Indication:

Power good	<1 V
Power bad	>4 V

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

SAFETY

Designed in accordance with UL1950, CSA C22.2 No. 950, IEC950, and EN60950. Meets the EMI requirement of FCC Part 15 Class A and EN55022 Class A. Meets the immunity requirements of EN50082-1.

This unit must be assembled and used in accordance with the instructions in this manual.

Note: *It is the responsibility of the person who sells the system of which the M5PSM will be a part to ensure that the total system meets allowed limits of conducted and radiated emissions.*

CHAPTER 3

MMAC-M5FNB SETUP

This chapter contains instructions to help you set up Cabletron Systems' MMAC-M5FNB. You will not need any special tools or equipment to set up the MMAC-M5FNB, but you must follow all guidelines listed in Chapter 2, **Installation Requirements and Specifications**.

CAUTION: *Only qualified personnel should install or service this unit and its modules.*

3.1 UNPACKING THE MMAC-M5FNB

Before you install the MMAC-M5FNB, you should inspect the unit.

To unpack the MMAC-M5FNB:

1. Remove the MMAC-M5FNB and fan tray from the shipping box. Save the shipping box and materials in the event the MMAC-M5FNB has to be reshipped.
2. Slide the two foam end caps off the MMAC-M5FNB, and remove the unit from the protective plastic bag. Set the MMAC-M5FNB aside in a safe place.
3. Remove the accessory package and verify that it contains two mounting brackets, a cable tie tray, and two security bars.

Contact Cabletron Systems Technical Support immediately if any discrepancy exists.

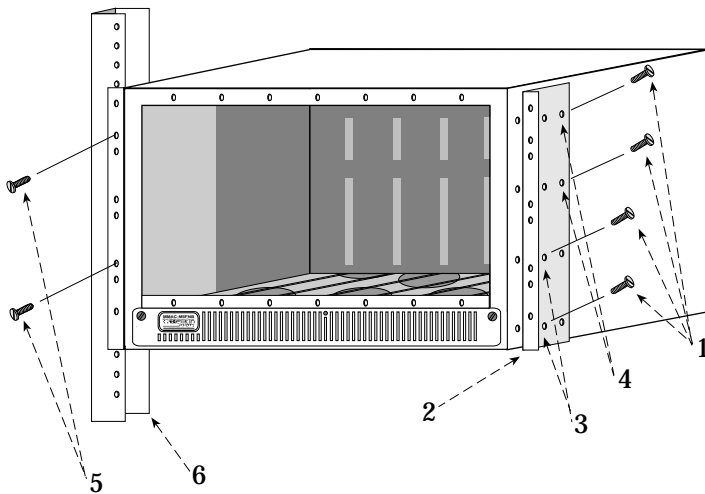
3.2 SETTING UP THE MMAC-M5FNB

The following sections list the steps necessary to set up your MMAC-M5FNB, including installing the MMAC-M5FNB in the desired location, inserting the fan tray, and inserting the power supply module(s).

3.2.1 Rack Mounting the MMAC-M5FNB

To mount the MMAC-M5FNB in a standard 19" equipment rack:

1. Using a Phillips head screwdriver, remove the eight screws (item 1, Figure 3-1, following page) – four on each side of the MMAC-M5FNB – which are closest to the front of the chassis, and set them aside.
2. The rack mount brackets (item 2) provided have two sets of holes: use the **front** holes (item 3) to mount the chassis flush with the equipment rack; use the **rear** holes (item 4) to mount the chassis so that it is recessed 3" from the front of the rack. Align the appropriate four holes on one rack mount bracket with the four holes from which you removed the screws.



- 1.) Screws (8 total; 4 each side)
- 2.) Rack mount bracket
- 3.) Holes for flush mount
- 4.) Holes for recessed mount
- 5.) Bolts (secure with locking washers)
- 6.) Equipment rack

Figure 3-1. Installing the M5FNB into a Rack

3. Insert the screws through the holes on the mounting bracket and into the screw holes on the MMAC-M5FNB.
4. Tighten the screws until the mounting bracket is securely attached to the unit.
5. Repeat steps 2-4 for the second rack mount bracket. Be sure to use the same set of holes on the second rack mount bracket (front for flush mount, rear for recessed mount) that you used on the first bracket.
6. Slide the unit into the rack, being sure to leave sufficient room to install the cable tie tray, if desired.

MMAC-M5FNB SETUP

7. Align the slots on each mounting bracket with the desired holes on the equipment rack.
8. Insert a bolt (item 5) through the slot in each of the mounting brackets and into the threaded holes in the equipment rack (item 6). Secure bolts with locking washers.
9. Tighten the nuts and bolts until the unit is secured to the rack.

3.2.2 Rack Mounting the Cable Tie Tray

A cable tie tray is provided with the MMAC-M5FNB to support and organize cables connected to the unit. The tray is designed to be installed under the MMAC-M5FNB in the equipment rack. To mount the cable tray in a standard 19" equipment rack:

1. Slide the cable tie tray (Figure 3-2, following page) into the rack.
2. Align the slots on each mounting bracket on the tray with the desired holes on the equipment rack.
3. Insert a bolt through the slots in each of the mounting brackets and into the threaded holes in the equipment rack. Use nuts with locking washers to secure bolts.
4. Tighten the nuts and bolts until the tray is secured to the rack.

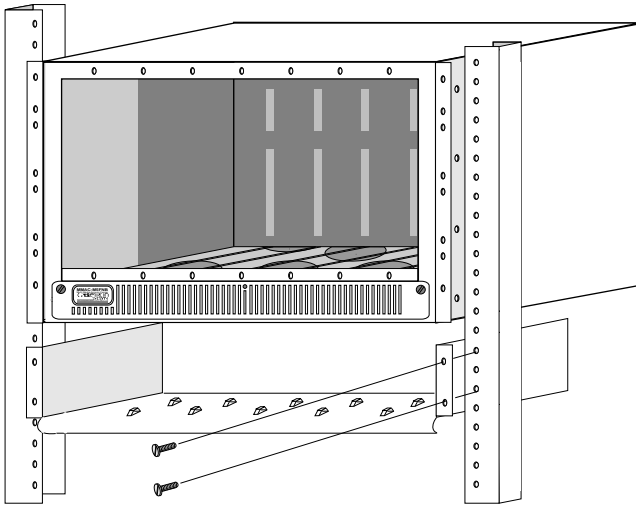


Figure 3-2. Cable Tie Tray Installation

3.2.3 Inserting the Fan Tray

The MMAC-M5FNB is equipped with a removable fan tray that allows for easy periodic cleaning and/or replacement if a problem occurs with fan operation. To insert the fan tray in the MMAC-M5FNB:

1. Hold the fan tray as shown in Figure 3-3 (following page) and align the slotted paths on the tray with the slot guides on the left and right walls of the MMAC-M5FNB chassis.
2. Slide the fan tray forward until the tray's face is flush with the face of the MMAC-M5FNB. If you encounter any strong resistance, remove the fan tray and reinsert it. Do not force the fan tray into place as this may damage the unit.
3. Once the tray is in place, tighten the knurled knobs to secure the tray to the MMAC-M5FNB.

4. When the MMAC-M5FNB is ready to be turned on, observe the LED on the front of the fan tray. This LED should be red for a moment after you turn on the power switch, and then change to green to indicate that all the fans are operating properly.

If this LED remains red, it indicates that one or more of the fans is not operating at the proper speed. Check the fan tray to ensure that nothing is interfering with movement of the fans. If you cannot find the problem, call Cabletron Systems Technical Support for assistance.

WARNING: *The fan tray is hot-swappable; however, the chassis must not be run without the fan tray for extended periods of time, as it will quickly overheat.*

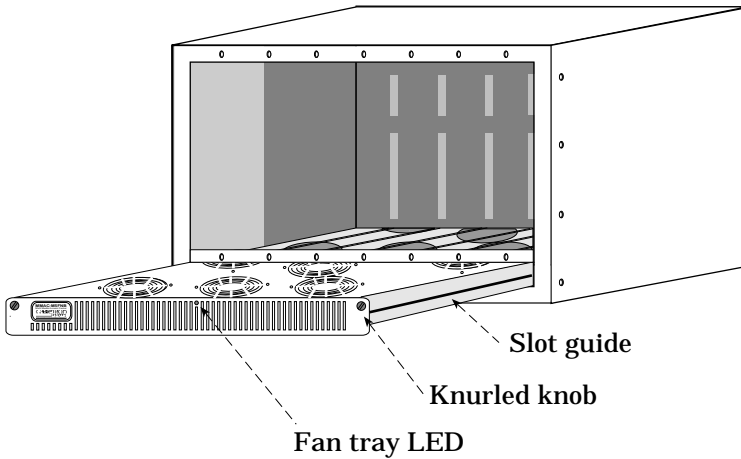


Figure 3-3. Inserting the Fan Tray

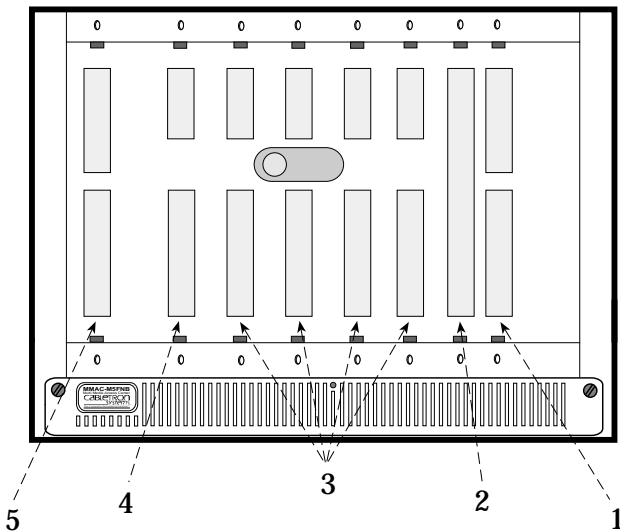
3.2.4 Installing the Power Supply Module

You must install at least one power supply module in your MMAC-M5FNB. One MMAC-M5PSM provides sufficient power for most MIM configurations, but you may choose to install a second power supply as a redundant, load-sharing power source. When two

MMAC-M5PSMs are installed, the load is evenly distributed; if one power supply fails for any reason other than a shorted DC backplane, the second power supply assumes the load.

Note: The power requirements of some FDDI configurations require dual power supplies.

The MMAC-M5FNB power supply modules must be installed in the rightmost and leftmost slots of the chassis (Figure 3-4). If you intend to install a single MMAC-M5PSM, install it in the rightmost slot; the far left slot is then available for an optional fifth MIM.



- 1.) Power supply module (required)
- 2.) Management module
- 3.) MIM slots
- 4.) Optional MIM slot (without redundant power supply)
- 5.) Optional redundant power supply module

Figure 3-4. Module Installation Diagram for the M5FNB

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Install the M5PSM(s) into your MMAC-M5FNB as follows:

1. Unpack the M5PSM by removing it from the shipping box and sliding the two foam end caps off the unit. Save the shipping box and materials in the event the unit must be reshipped.
2. Remove the M5PSM from its protective plastic bag.
3. For the optional redundant power supply module, loosen the knurled knobs securing the panels over the leftmost M5PSM opening in your MMAC-M5FNB and remove the panels. Keep the panels in case you need to remove the M5PSM. (**Note:** *There are no panels over the rightmost M5PSM opening.*)
4. Slide the M5PSM into the appropriate slot of the MMAC-M5FNB (Figure 3-5) as follows:
 - a. Hold the module by placing one hand on the handle located on the front panel and using the other hand to support the body of the module.
 - b. With the LEDs at the top of the M5PSM, align the M5PSM with the slotted paths on the top and bottom of the opening.
 - c. Ensuring that the power supply is inserted into the slotted paths, carefully slide the module forward until the module is connected to the backplane and its front panel is flush with the face of the MMAC-M5FNB. Do not force the module into place. If you encounter significant resistance before the front panel is flush, remove and reinsert it.

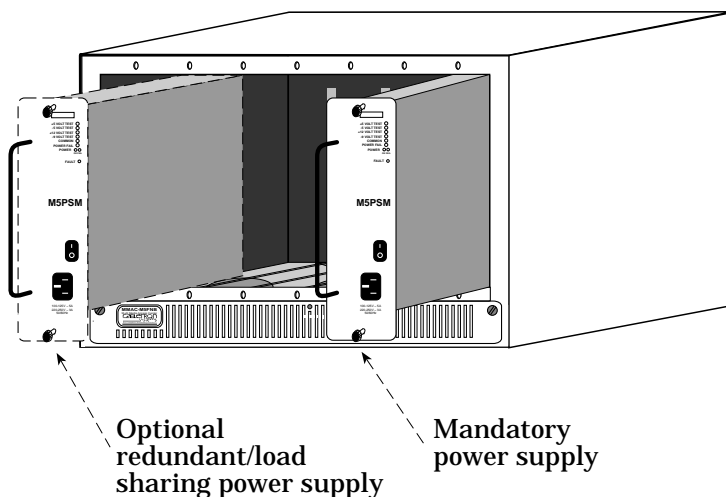


Figure 3-5. Installing the Power Supply Module(s)

5. Tighten the knurled knobs to secure the M5PSM to the MMAC-M5FNB.
6. If you are installing an additional M5PSM, repeat steps 3 - 5.

After you have finished installing the power supply module(s), the MMAC-M5FNB is ready to be powered up; however, we recommend that you first install the repeater/management module and the MIM or MIMs, as well as the security bars (if desired). Refer to the applicable module manuals for more information about MIM installation; see below for security bar installation and power-up instructions.

3.2.5 Installing the Security Bars

The MMAC-M5FNB is equipped with security bars to prevent unauthorized access to the hub and its installed modules. Two security bars have been provided: one to cover the top row of knurled knobs securing the modules to the chassis, and one to cover the bottom row of knobs.

MMAC-M5FNB SETUP

To attach the security bars to the chassis:

1. Install all power supplies and MIMs in the M5FNB hub, as desired; be sure to install panels over any empty slots.
2. Place one of the security bars across the top row of knurled knobs securing the modules and panels to the chassis; align the screws in the security bar with the holes in the chassis (as illustrated Figure 3-6, below), and tighten the screws. Repeat the procedure with the second security bar, using it to cover the bottom row of knurled knobs.

Install the security bars over the knurled knobs on the modules; align the screws in the security bars with the holes in the chassis as indicated, and secure.

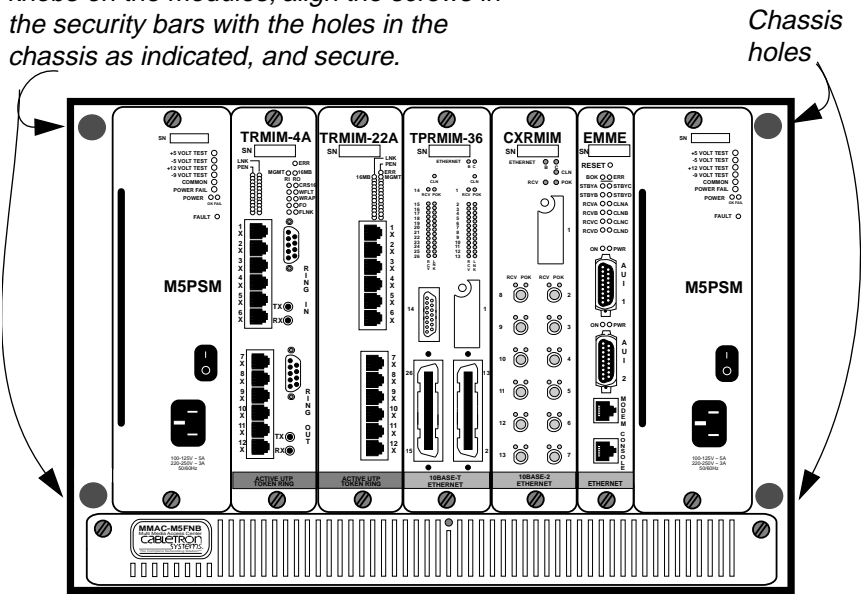


Figure 3-6. Installing the Security Bars

3.2.6 Powering Up the MMAC-M5FNB

Power up the MMAC-M5FNB as follows:

1. If the MMAC-M5FNB will not be rack mounted, place it on the selected site.
2. Plug a power cord into the power receptacle located on the front of each installed power supply.
3. Plug the power cord(s) into an outlet and move the power switch on each power supply to the on position.
4. Make sure that the Power OK LED is lit.

Note: *If you have not yet installed a repeater/management module and/or a MIM or MIMs, the Fail LED may remain lit until installed MIMs create a power load. At that time, the green (Power OK) LED will light.*

5. Make sure that all the fans in the fan tray unit are operating correctly when power is received from the M5PSMs (fan tray LED will be green).

If you experience any problems during the installation of the MMAC-M5FNB, contact Cabletron Systems Technical Support for assistance.